ASSESSING THE IMPACT OF PRODUCTIVITY MANAGEMENT PROGRAMS AND PRACTICES IN SELECTED MILK PRODUCER COMPANIES OF UTTAR PRADESH

SYNOPSIS

SUBMITTED IN THE PARTIAL FULFILMENT FOR THE REQUIREMENT OF

DOCTOR OF PHILOSOPHY

IN

MANAGEMENT

Submitted by

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2024

1. Introduction

The dairy industry is important for making sure we have enough food to eat, helping people who don't have a lot of money, giving jobs to women, and providing work for families who live in the countryside. But sometimes, there are problems that can make it hard for dairy farmers to do their job well. In India, there are different levels of dairy organizations that work together to make sure everyone has enough milk to drink and to stop any bad things from happening in the dairy industry. India has a lot of villages, and things are changing a lot with the internet and new businesses popping up in rural areas. It's really important for us to understand how farmers and people who buy their products work together, and to teach young people how to take care of animals and run dairy farms. This could make a big difference for India's economy and help people in rural areas have better lives. About 72.3 percent of the population in the state of Madhya Pradesh lives in villages. There is no raise in rural income in Madhya Pradesh, Chhattisgarh and Rajasthan. Wages in the countryside is depressed and income from crops is insufficient (Economic Times analysis, December 13, 2018).

1.1 Dairy Sector in India

Dairy farming is really important in India because it helps the country grow economically and socially. Technology is getting better in dairy farming, but it's also important to teach farmers new ways to improve. Farmers have to think outside the box, try new things, and stay updated on the latest technology. India has been doing really well with dairy farming, especially with the White Revolution. Small farmers are a big part of dairy farming in India. They usually have other types of farming too, like growing crops or raising animals. The way farmers do things in India is unique because it's connected to their way of life and the environment. Since India became independent, there's been a focus on making more milk. Schools and other organizations have come up with ways to help farmers make better milk and more of it. Some farmers have picked up bad habits along the way, but they're learning to be cleaner and healthier.

Livestock helps the economy and helps out lots of families in rural areas. Livestock gives us things like milk, meat, eggs, and more. It even helps with farming by providing power. In India, livestock makes up about 6.17% of the total money made in the country and almost 31% of the money made in agriculture. Over the years, the money made from farming has gone down a bit, but the money made

from livestock has gone up. (GoI,2022-23)

India remains the largest milk producer in the world. Several measures were initiated by the government to improve livestock productivity, which led to a significant increase in milk production. Milk production in 2020-21 and 2021-22 was 209.96 million tons and 221.06 million tons, respectively, which shows an annual growth of 5.29 percent. In 2021-2022, per capita available milk will be approximately 444 grams per day. Milk production and annual growth rate (%) from 2011-12 to 2021-22 is as follows:

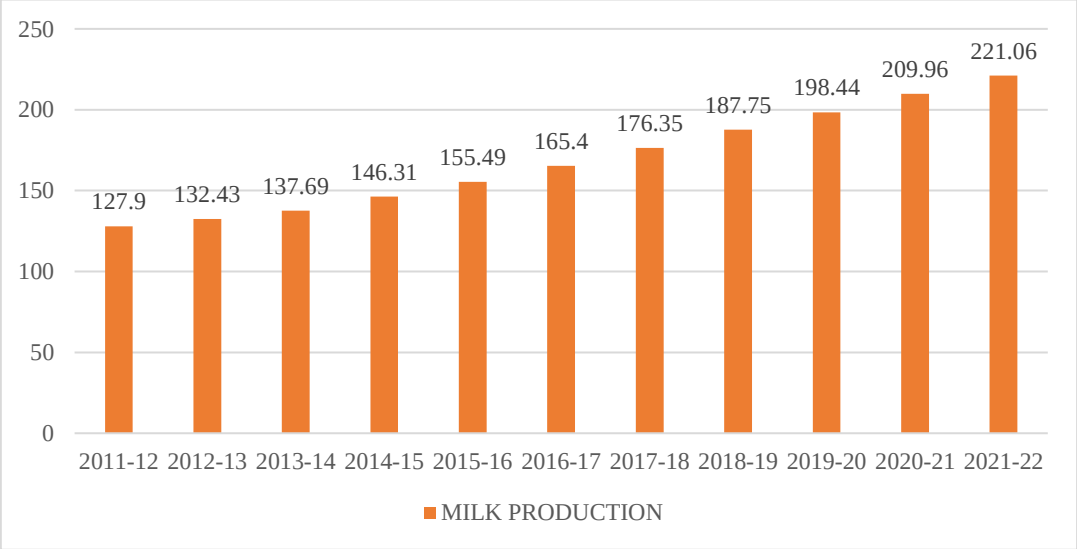

Figure 1: Milk production with annual growth rate percentage from 2011-12 to 2021-22 in India
(Source: Annual Report 2022-23, Department of animal husbandry and dairying, GOI.)

Milk production in the country has continued to grow by about six percent annually, while per capita availability has seen an increase of more than 4.5 percent over the past five years. By 2022-23, milk production in the country is likely to be 230 million tonnes and per capita availability of milk is expected to be 455 grams per day. Despite the challenges, milk procurement by dairy cooperatives remained resilient, with an average of 589 LKgPD purchased during 2022–23. Dairy cooperatives continued to support dairy farmers by providing technical inputs and extension services such as veterinary services, artificial insemination (AI) services, vaccination, balanced cattle feed, fodder seed, mineral compounds, etc. (NDDB, A. R 2023).

Dairy farming plays a crucial role in India's economic and social development, with efforts to enhance productivity and efficiency evident through initiatives like the White Revolution. Despite challenges,

the country has witnessed steady growth in milk production, with significant contributions from small farmers. As technology advances, there's a need for continuous education and adaptation among farmers to optimize farming practices. With sustained support from government initiatives and dairy cooperatives, India's dairy sector is poised for continued growth, benefiting both the economy and rural livelihoods

1.2 Milk production in Uttar Pradesh

Uttar Pradesh is the highest milk producing state in the country accounting for about 16% of the total milk production of the country. Only about 10% of marketable surplus milk is processed by the organized sector in the state, while India's average milk processing capacity is about 17%. There is a huge gap between the state's milk processing capacity and the amount of surplus milk available in the market, and there is great potential for investment in new industries in this area.

At present, dairy cooperative operations in Uttar Pradesh are spread across about 4,600 villages in 48 districts, including seven districts in eastern Uttar Pradesh. By next year, milk collection is expected to increase to 7,000 villages in 70 districts, including 15 new districts in eastern UP. Currently, about 1300 dairy cooperatives have been established in eastern UP, of which more than 600 are currently active. It is expected that the number of dairy cooperatives will increase to 2600 by the end of this year. Currently, dairy cooperatives work with about 350,000 milk producers in UP. In the coming days, the dairy cooperatives in collaboration with rural farmers will reach another 200,000 milk producing households in the state, including 30,000 households from Varanasi and 70,000 households from other districts of eastern UP. Uttar Pradesh is making wartime preparations to set up nine new green dairy plants. These plants will be operational in the next year or two. I request the National Dairy Development Board to support UP and take advantage of the dairy sector opportunities that exist in the state. The UP government is ready to support it (India, 2024).

Uttar Pradesh emerges as a significant contributor to India's milk production, yet faces a notable disparity between its processing capacity and marketable surplus. The state's dairy cooperatives are expanding rapidly, with plans to increase milk collection across more villages and districts, particularly in eastern UP. With the establishment of new green dairy plants on the horizon and the government's commitment to support and collaborate with organizations like the National Dairy Development Board,

Uttar Pradesh presents promising opportunities for investment and growth in the dairy sector.

1.3 Milk Producer Companies (MPCs) in India

The Government of India has decided to establish and promote Farm Producer Organizations as a viable alternative to cooperatives at the ground level. In this regard, the Government of India amended the Companies Act, 1956 by incorporating Farmer Producer Companies as part of IX A, based on the recommendations of Y.K. Alagh Committee (Alagh, 2007) (Mondal, 2010).

National Dairy Development Board facilitated the establishment and operation of Milk Producer Companies (MPCs). NDS has successfully established 19 MPCs, six of which are supported under the National Rural Livelihoods Mission (NRLM). Twelve of these MPCs have all-female members and all-female producing directors on their respective boards. The production company is a combination of a joint stock company and a cooperative. It combines the benefits of professional management of the former with welfare considerations of the latter (NABARD, 2015). Minesh Shah Chairman of National Dairy Development Board (NDDB) said, milk producer companies procured Rs 5,575 crore of milk in the last financial year and this will triple to Rs 18,000 crore in the next five years. (Economic Times Analysis, September 15, 2022).

To promote antibiotic-free milk, NDS has initiated veterinary practices in these Milk Producer Companies. During the year, more than 1.1 million AIs were performed in these Milk Producer Companies operational areas. Milk Producer Companies are different from other companies that make stuff from farmers because they have a bunch of farmers who own part of the company. In addition, many Milk Producer Companies were converted from old dairy cooperatives with large membership and capital. Additionally, the dairy sector has a well-established collection, sourcing, processing and marketing plan that makes it relatively easy for even new dairies to increase membership and expand their operations rapidly. (Neti et al., 2019).

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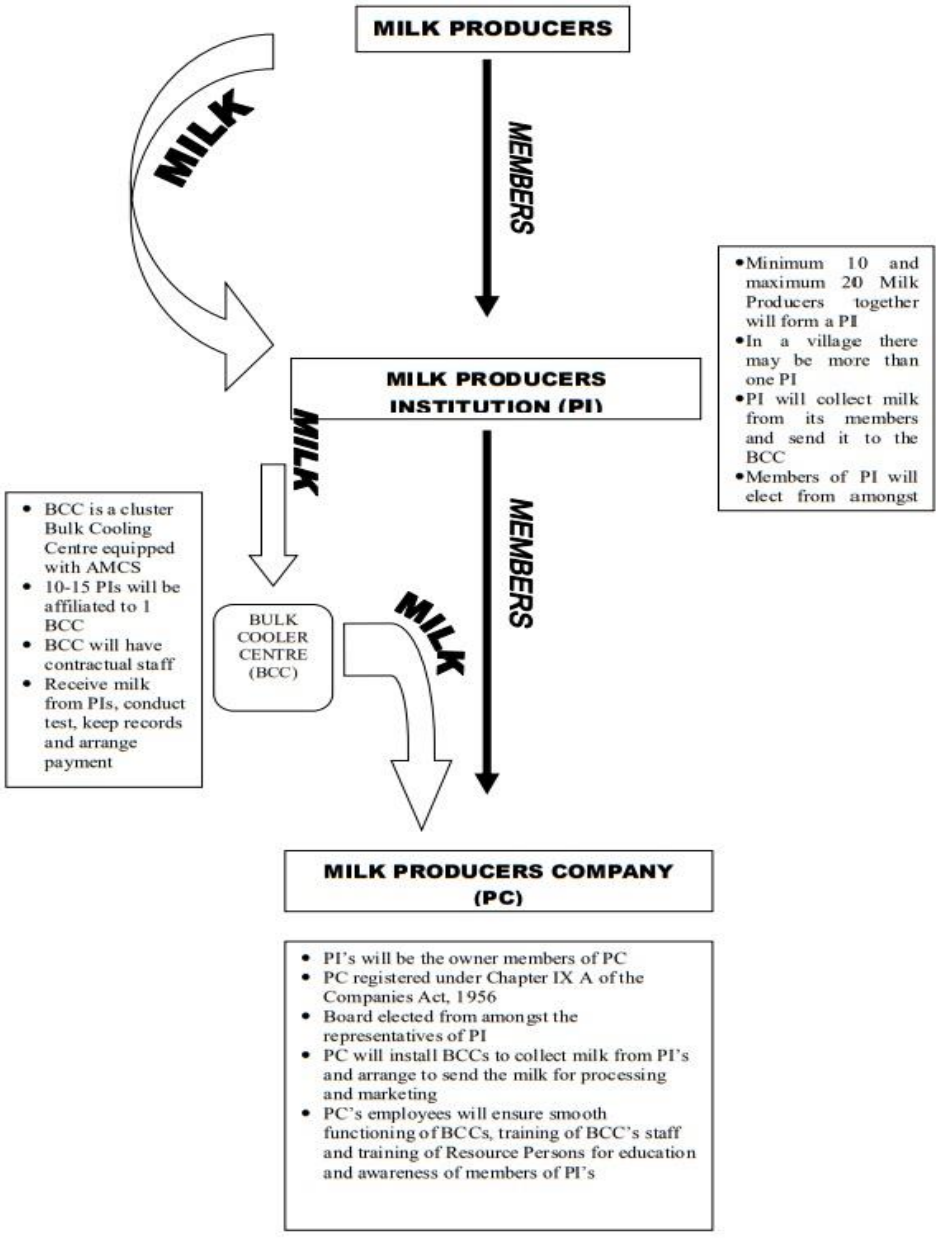
MILK PRODUCERS
MILK
MEMBERS
•Minimum 10 and maximum 20 Milk Producers together will form a PI
•In a village there may be more than one PI
•PI will collect milk from its members and send it to the BCC
•Members of PI will elect from amongst
MILK PRODUCERS INSTITUTION (PI)
MILK
MEMBERS
• BCC is a cluster Bulk Cooling Centre equipped with AMCS
• 10-15 PIs will be affiliated to 1 BCC
• BCC will have contractual staff
• Receive milk from PIs, conduct test, keep records and arrange payment
BULK COOLER CENTRE (BCC)
MILK
MILK PRODUCERS COMPANY (PC)
• PI's will be the owner members of PC
• PC registered under Chapter IX A of the Companies Act, 1956
• Board elected from amongst the representatives of PI
• PC will install BCCs to collect milk from PI's and arrange to send the milk for processing and marketing
• PC's employees will ensure smooth functioning of BCCs, training of BCC's staff and training of Resource Persons for education and awareness of members of PI's

Figure 2: Milk collection process of Milk Producer Company
(Source: Annual Report 2022-23, National Dairy Development Board.)

The National Dairy Development Board (NDDB) took the lead in setting up dairy enterprises in areas where cooperatives either do not exist or have little coverage and resources (Singh, 2019). In 2005, we started organizing milk producers in Saurashtra-Kutch region as milk production institutes. These milk

production institutions gradually became milk production companies (NDDB, 2020).

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Currently there are 210 active milk production companies in India. 81% of them are under 5 years old. 50% of the top 20 agricultural producers are dairy-based (Neti et al., 2019). Some of India's leading milk producers Mahi (Gujarat), Payas (Rajasthan), Saahaj (UP), Bani (Punjab) and Srija (AP) are supported by NDDB (Shah, 2016). More than half of the active Milk Producer Companies exist in only four states: Maharashtra, Rajasthan, Madhya Pradesh and Uttar Pradesh (Govil et al., 2020).

1.3.1 Profile of selected Milk Producer Companies (MPCs) in Uttar Pradesh

1.3.1.1 Saahaj Milk Producer Company Limited

Saahaj Milk Producer Company Ltd (SMPCL) was incorporated on 17th October 2014 with its headquarters located at Agra, in Uttar Pradesh. The MPC commenced its business operations from 12th December 2014. The main objective of SMPCL is to carry on the business of purchasing and processing of milk of its members. Currently SMPCL is operating in 10 districts of Uttar Pradesh & Procured 5.80 Lakh Kg of milk per day from more than 100000 registered members.

1.3.1.2 Balinee Milk Producer Company Limited

Balini Milk Producer Company Limited was incorporated under the Companies Act 2013 on 24th January 2019 with its headquarters in Jhansi, Uttar Pradesh. The company was created to help women who produce milk by giving them a fair market to sell their products, making sure they get paid on time, and helping them improve their milk production. The company was officially opened by the Chief Minister of Uttar Pradesh, Yogi Adityanath, in December 2019. Right now, there are about 63,000 women who are part of the company and together they supply around 2.15 lakh kgs of milk every day. The company was started as part of a project called “Dairy Value Chain Development in Bundelkhand region of Uttar Pradesh” and is supported financially by the National Rural Livelihood Mission and Uttar Pradesh State Rural Livelihood Mission. NDDB Dairy Services is also helping out as a Technical Support Agency.

1.3.1.3 Kashee Milk Producer Company Limited

Kashee Milk Producer Company Limited, Varanasi was incorporated in November 2021 with an aim to provide sustainable livelihood alternative through dairying to the milk producers round the year in the 5 districts of Eastern Uttar Pradesh namely Ballia, Chandauli, Ghazipur, Mirzapur and Sonbhadra. As of now, we are procuring more than 150000 liters of milk per day from more than 25000 active members and more than 700 villages.

1.3.1.4 Harit Pradesh Milk Producer Company Limited

Harit Pradesh Milk Producer Company Limited (HPMPCL) was incorporated on 26th October, 2021 under Chapter XXIA of the Companies Act, 2013. The company commenced operations on 21st March 2022. It strives to uplift livelihood and bringing socioeconomic change through dairying in its area of operations. Inaugurated on 22nd May, 2022 by Hon'ble Union Minister of State for Fisheries, Animal Husbandry and Dairying Government of India, Dr. Sanjeev Kumar Balyan, HPMPCL had already spread its wings in over 1,500 villages of 7 districts namely Muzaffarnagar, Meerut, Bulandshahr, Saharanpur, Hapur, Shamli and Bijnor, and as of now is collecting 1,50,000 liters of milk every day from more than 30,000 members.

1.3.1.5 Shwetdhara Milk Producer Company Limited

Shwetdhara Milk Producer Company Limited was incorporated on 25th April, 2016 with registered name Shwetdhara Milk Producer Company Limited with aim of bringing about a socio-economic change through animal husbandry. On 30th December, 2016 Shwetdhara milk producer limited officially began its business operations of collection of milk from its members, with our services we were able to get our women members the best prices for their milk in the area. As of now, we are procuring more than 100000 liters of milk per day from more than 20000 active women shareholder members.

The paid-up share capital stands at 282 lakh rupees and is increasing as we connect to more and more women in the area towards a productive relationship. 87% of the total revenue company generates is directly transferred to the accounts of our producer members which is a benchmark in itself for a producer company.

1.4.1 Features of milk producer company

1.4.1.1 Impact on the life of farmers

Milk Pouring Points have made a big difference in the lives of farmers living in rural areas. When we visited one of these points, we talked to farmers who were there to drop off their milk. They were excited to learn about all the ways the producer company was helping them. These companies help farmers by teaching them new skills, giving them better tools, providing them with supplies, processing their products, and helping them sell their goods. This has not only helped farmers make more money, but it has also improved their overall quality of life. Many studies have shown that these types of programs are really making a positive impact on farmers' lives. The result is in line with the results of the studies conducted by (Mishra 2004), (Bernard and Spielman,2009), (Fischer and Qaim,2012).

MPCs are helping small farmers make money consistently by buying their milk at fair prices. Farmers get paid three times a month, and the money goes right into their bank accounts. They don't have to worry about anyone else handling their hard-earned cash. This helps farmers make more money, so they can buy more things. Farm Producer Companies helped farmers make more money, so they were able to buy more things. Farm Producer Companies regularly conducted capacity building and training programs for their member farmers (Mukherjee 2020). The MPCs are also helping by recommending them. More farmers need to have access to loans and insurance in the dairy sector. This will help all farmers in the long run (Patel,2016). Farmer producer companies are awesome because they're giving people in the countryside job opportunities. They hire folks to help out with running the company, which is important for the community. Farmer producer companies need various human resources for the management of Farm Producer Companies in rural areas (Mukhrejee 2019). Women were in charge of running farm producer companies, so the research shows that these companies can help empower women (Mukherjee 2020 and Desai 2014).

Farm Producer Companies provide services such as raw material supply, training and development, value chain management, marketing, financial support, technical support and social security (Trebbin and Hassler, 2012; Trebbin, 2016; Mukherjee et al., 2019). Producer companies provide small and marginal farmers with more leverage to compete in agricultural markets. It provides the possibility of reducing transaction costs, input costs, improving access to inputs, increasing output, access to market

information, access to innovative and enabling technologies, and access to high-end markets. to set prices in market and help to obtain high prices (Stockbridge, 2003 and Manaswi,2018).

1.4.1.2 Benefits to the Cattles

Livestock has become an integral part of any intervention aimed at ensuring food security and improving the economic status of a country. Improving milk production, milk quality, animal health and reproductive performance are prerequisites for the success of dairy farms (Kansal et al. 2020). Adopting advanced management practices increases milk production and quality, improves reproductive health and performance, and provides higher economic returns. Various studies show that proper shelter management and careful handling of dairy animals improves animal welfare and reduces stress levels (Singh et al. 2020). veterinary services at affordable costs are an important enabler for enhancing milk yield. But currently due to lack of adequately trained manpower and their mobility, the services provided do not create desired impact (Patel,2016).

1.5 Productivity

Productivity in the dairy sector is crucial for meeting growing demands for dairy products worldwide. Technological advancements, such as automated milking systems and precision feeding, have significantly increased efficiency. Genetic selection for high-yielding dairy cattle breeds also plays a vital role in boosting productivity. Moreover, improved management practices, like better herd health protocols and optimized nutrition programs, further enhance output. However, challenges such as fluctuating milk prices, environmental concerns, and labour shortages continue to impact productivity and require innovative solutions for sustainable growth in the dairy industry.

1.5.1 Productivity Management

Productivity management in the dairy sector involves optimizing resources to maximize output while minimizing costs and inefficiencies. This includes efficient herd management practices, such as proper breeding, nutrition, and health protocols to ensure high milk yields. Implementing modern technologies like data analytics, IoT devices, and automated milking systems can streamline operations and enhance productivity. Regular monitoring of key performance indicators, such as milk production per cow and feed conversion rates, helps identify areas for improvement. Additionally, training and development programs for dairy farm staff contribute to a skilled workforce capable of driving productivity gains in

the sector.

1.5.2 Productivity Management and Practices

Productivity management and practices in the dairy sector are essential for both dairy farmers and milk producer companies to thrive in a competitive market. Farmers employ efficient breeding techniques and optimal nutrition programs to maximize milk production per cow. Regular health monitoring and disease prevention measures ensure the well-being of the herd and sustained productivity. Milk producer companies invest in modern technologies like automated milking systems and data analytics to streamline operations and improve efficiency along the supply chain. They also focus on sustainable practices to reduce environmental impact and enhance long-term productivity. Collaboration between farmers and producer companies facilitates knowledge exchange and adoption of best practices, driving overall sector productivity. Moreover, continuous training and education programs empower farmers with the latest advancements in dairy management, fostering innovation and growth in the industry.

2. Review of Literature

The review of literature for the proposed research is carried out to understand the basic concept of dairy farming practices in Uttar Pradesh as well as in India. The reviewed literature comprises the reviewed of selected papers that focused the dairy farming management practices and program all the papers highlighted the issue and challenges related to the production profit and farmer's growth. The obtained data in almost all this paper were survey based. papers and articles related to productivity Management, technology Management, institutional management and marketing management, those are supporting the research.

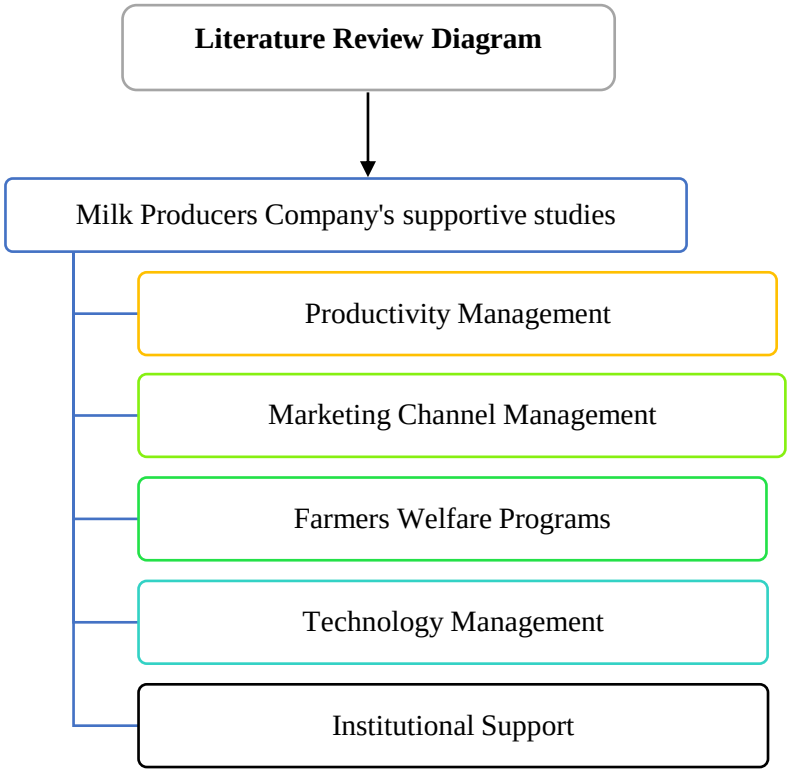

Figure 3: Snapshot of Literature Review
(Source: Author's Compilation)

2.1 Productivity Management programs

Gillespie et al., (2014) the researcher found that adoption rates of 19 dairy technologies, management practices, and production systems (TMPPS) are estimated for the U.S. for 2005 and 2010 and, in cases where data are available, 1993 and 2000. Logit models are estimated to determine types of farms most likely to use each TMPPS. TMPPS experiencing the greatest increases in adoption have been automatic take-offs, the internet, breeding technologies, and USDA certified organic production; recombinant bovine somatotropin experienced a reduction in usage between 2005 and 2010. Factors influencing TMPPS usage include farm size, tenure, and diversification; farmer age and education; and region of the U.S. where the farm is located.

Nagale B G et al., (2015) analysed the constraints faced by dairy farmers in Vidarbha region of Maharashtra. Vidarbha region is a rainfed region of Maharashtra and dairy farming plays an important role in their livelihood. Therefore, for the analysis, a detailed questionnaire was administered on various aspects of feed, breeding, marketing and institutional constraints involved in animal husbandry and livestock farmers in the study area were asked to rate each constraint and Garrett's It using It was

analysed by the ranking method. Lack of access to green feed is the main limitation of feed, low productivity of livestock is a limitation of breeding, low price of liquid milk is a marketing limitation, and organizational limitations are artificial intelligence and lack of veterinary facilities. Yes, and in general there were no major restrictions considering all of the above categories. Availability of green fodder

Lemma et al., (2018) This paper discusses methods for improving milk safety in smallholder dairying and the methodology used is analyzing best practices/experiences of selected countries and Ethiopian dairy farming as a case study (household survey and milk testing). The results of the study show that the coliform count was slightly higher than European standard. The value of total bacterial count found was higher than the standard of bacteriological quality of milk. Somatic Cell count is slightly higher than US standard, but it is in the range of the EU standard. Moreover, there were other associated challenges facing dairy farmers, including shortage of feed concentrate and water, milk marketing, health of dairy stock, and manure management. The efforts of private veterinarians to engage in provision of drugs and on-call home-treatment for stall-fed cows were good, but this needs to be complemented with laboratory based-diagnostic/clinical and advisory services prevent diseases. The conclusion stated that improvement of milk safety can be achieved through good management practices by dairy farmers, market incentives, and increased efforts of various stakeholders and the adoption of best practices. In this regard, a coordinated action involving all stakeholders is needed to implement preventative/control measures, quality management strategies, and appropriate regulation while supporting and building capacity of smallholder dairy producers to minimize risks associated with milk production.

Sivaraman et al., (2019) conducted a study on better management practices for sustainable small scale shrimp farming. A farm level survey was conducted among 300 smallholder farmers in East Godavari and Nellore districts. The study involved face-to-face interviews conducted at home or in the field using a pre-tested interview schedule. The program included questions about farmers' socio-economic status and production practices. Specifically, farmers were asked about the adoption of different best management practices (BMPs) and classified into groups. Answers were recorded as yes (score 1) or no. We wanted to learn all about how small shrimp farms are using the best ways to take care of their

shrimp. This study showed that farmers' decisions to adopt BMPs are influenced by various factors, including farmer's individual characteristics and specific farm conditions. Farmers tend to selectively use BMPs that they consider necessary to achieve crop success and higher economic returns. However, BMPs that require large investments have low adoption rates.

Mukherjee,A, (2020) This study has been carried out to diagnose the effect of joining farmers' producer company (FARM PRODUCER COMPANIES) on livelihood enhancement of dairy farmers, Hardol Milk Producer Company Limited (HMPC) was selected for the study. Difference in difference research design was used to record the effect of joining HMPC on enhancing sustainable livelihood dimensions of dairy farmers. For measuring that a sustainable livelihood index was developed which includes six different capital dimensions viz., natural, physical, economic, human, social and political capitals. Equal weightage method of livelihood index formulation was adopted to study the changes in livelihood capitals over time between the treatment and the control group under study. The members and non-member dairy farmers were also compared based on eleven different socio-personal, socio-psychological variables and fifteen management practices related to dairy farming. It revealed that joining HMPC helped farmers to enhance their annual income from milk sale, social participation, extension agency contact, urban contact significantly. A significant difference in different livelihood dimensions was recorded between the HPMC members and control group which indicated joining the dairy based producer company enhanced member farmers' livelihood security, particularly in social capital (0.385) human capital (0.375) economic capital (0.232) and political capital (0.225).

Fuentes et al., (2020) In this study, researcher studied that Increased global temperatures and climatic anomalies, such as heatwaves, as a product of climate change, are impacting the heat stress levels of farm animals. These impacts could have detrimental effects on the milk quality and productivity of dairy cows. This research used four years of data from a robotic dairy farm from 36 cows with similar heat tolerance (Model 1), and all 312 cows from the farm (Model 2). These data consisted of programmed concentrate feed and weight combined with weather parameters to develop supervised machine learning fitting models to predict milk yield, fat and protein content, and actual cow concentrate feed intake. Results showed highly accurate models, which were developed for cows with a similar genetic heat tolerance (Model 1: n = 116, 456; R = 0.87; slope = 0.76) and for all cows (Model 2: n = 665, 836; R =

0.86; slope = 0.74). Furthermore, an artificial intelligence (AI) system was proposed to increase or maintain a targeted level of milk quality by reducing heat stress that could be applied to a conventional dairy farm with minimal technology addition.

Gamit V et al., (2021) focuses on various constraints faced by dairy farmers in different states of India. Most of the authors from northern states observed that lack of green fodder, high feed costs and poor AI are the main constraints. In the eastern states, which mainly have unfavourable climatic conditions, constraints include lack of green fodder, infertility problems in cows, non-availability of artificial insemination (AI) centres and high medical costs, the authors of the region say. They are watching. The north-eastern region is largely hilly, which has been a major constraint for the herdsmen against the observed low milk prices, poor availability of green fodder, frequent breeding and inadequate treatment services. The central region, which includes dairy farmers in India's largest state, faced problems such as low milk prices, livestock farmers not having quality animals, low-yielding local cattle and poor quality fodder and fodder. Similarly, in the western states, inadequate irrigation facilities, veterinary service hours and insufficient knowledge about the disease were the main constraints. In the southern states, the main constraints faced were high costs of dairy animals, feed and concentrates, low AI conception rates, and high costs of labor and veterinary services.

G. shaikh et al., (2022) analysed the socio-economic status of pastoralists, management practices and nutritional status of dairy cattle in Pulwama district of Kashmir Valley. A comprehensive survey was conducted in different veterinary blocks of Pulwama district and it was found that agriculture is the main source of income followed by unskilled labour, government employment and skilled labour. The average number of cows/family in the region is 3.71 and the average number of dairy cows, dry cows, heifers, calves and bulls is 1.40, 0.23, 0.88, 1.12 and 0.18, respectively. The average number of sheep, goats, horses and birds per family in the region was 21.06, 8.27, 3.03 and 19.87 respectively. The average age of dairy cows was recorded as 6.36 years, which shows that most households prefer young cows with an average weight of 250.75 kg. The average milk production of dairy cows was 8.68 litters per day. The concentrates available were mainly wheat bran, rice bran, mustard oil meal and commercial pellet feed, while forages were mainly rice straw, wheat straw, oat hay, mixed hay and corn stover. Only 11.89% of the farmers of this district were supplementing with vitamins, minerals and salt. Dairy

animals in Pulwama district were deficient in daily dry matter, DCP and TDN intake of 0.64 kg, 43.04 g and 0.72 kg respectively.

Monica, K., (2022) this paper aims to determine the extent to which dairy animal nutrition and animal health influences the level of milk production. The aim of the study is also to determine the role played by animal hygiene in improving and sustaining milk production as well as the extent to which observance of animal welfare influences the performance of the cattle in terms of mil production. This paper adopted a desk study review methodology where relevant empirical literature was reviewed to identify main the themes. The study found out that preserving water supplies and feeds from contamination and feeding animals on good quality feeds influenced milk production to a very great extent. Adopting appropriate farm management practices such as milking hygiene, environmental sanitation, and regular veterinary care (e.g., periodic check-ups, prompt treatment of illness) of cows helps to assure the well-being of dairy cows and reduce their risk of infections such as clinical mastitis. It is important to ensure good milking techniques since incorrect techniques can result in a higher mastitis risk and injury to the cow which translates to lower level of milk production or even contamination of milk.

Singh et al., (2023) conducted a study to assess the level of knowledge of beneficiary and non-beneficiary dairy farmers on improving milk production technology in Udaipur district of Rajasthan. The objective of study was to identify the knowledge of the farmers regarding the improvement of milk production practices. Farmers' knowledge in five key areas of improving milk production practices (feed, breeding, medicine, general management and marketing) was determined using a standard knowledge test. The study found that farmers who receive benefits and those who don't know different things about making more milk from cows. The level of knowledge of the beneficiary farmers regarding breeding methods, feed, management, health care and marketing methods is high.

2.2 Marketing Channel Management

Trebbin et al., (2012). In this article, the researcher has presented that producer companies can help smallholder farmers participate in emerging high-value markets, such as the export market and the unfolding modern retail sector in India. As elsewhere in the developing world, in India, small farmers' livelihoods are being threatened due to the liberalization and privatization of Indian agriculture and the

increasing interest of private capital in the agribusiness sector. The withdrawal of the state from productive and economic functions, and changes in the organization of marketing channels, present new challenges for small-scale farmers. In this environment of greater instability and competition, organization and collective action can help to enhance farmers' competitiveness and increase their advantage in emerging market opportunities. Based on a case study of a specific producer company in Maharashtra, which produces and markets mango and cashew nuts, the researcher has discussed the potential benefits for rural communities and the repowering effect of this form of farmer organization.

Sankar et al., (2016). The study provides the analysis of problems, difficulties, and constraints faced by the respondents in the study area. This study is descriptive and analytical study. It is based on both primary data and secondary data. The researcher collected the primary data by using pre-determined and well-structured interview schedule. The study also revealed that the lack of cold storage facilities, lack of all-weather roads, private trading and local politics are the major problems in the collection of milk by the producer's milk co- operative societies in the study area.

Jose et al., (2019) conducted a study on dairy-based farm production enterprises in five companies in Kerala. 24 people were randomly selected from each company. The survey revealed that the main reason for establishing the company, as answered by 96.66 percent of the respondents, was the desire to eliminate middlemen and achieve better price realization through direct sales of agricultural products. In addition, 90.83 percent of the respondents mentioned the availability of agricultural products at reasonable rates and benefiting from various government schemes through manufacturing companies as important factors. Other important reasons include adopting modern technology, reducing risks in agriculture, empowering women, adding value, building capacity and providing storage facilities.

Nikam et al., (2019) argue that Farm Producer Organizations act as intermediaries between smallholder farmers and the outside world, facilitating forward and backward communication, providing a voice for farmers, and providing access to They increase the market. They enable and strengthen the bargaining power, enable the economy. Various studies have highlighted the benefits of Farm Producer Organizations with prominent marketing-related benefits such as access to various market channels, risk reduction, reduced transaction costs, and economies of scale. Some studies recommend the creation of female Farm Producer Organizations to ensure equal participation, as male dominance in mixed Farm

Producer Organizations can hinder women's participation. The structure of Farm Producer Organizations varies from country to country based on legal and policy frameworks. The ability to build and maintain external relationships is essential to the long-term success of an FPO. Farm producer Organizations perform important development and advisory functions including demand definition, service delivery, capacity building and funding. Several studies have identified weaknesses related to organizational and group dynamics that can be overcome through supportive policies, ethical practices, professionalism, and coalition building to ensure the success and sustainability of Farm Producer Organizations.

Mukherjee et al., (2019) conducted research on study looked at what helps and what holds back Farm Producer Companies in India from growing and doing well. Researchers visited eight different Farm Producer Companies and talked to 293 members to gather information. In-depth key informant interviews were conducted to ensure data triangulation. The study focused on five dimensions: technical factors, organizational factors, economic factors, infrastructure factors and marketing factors. These dimensions were assessed to determine the facilitators and barriers to farm producer company's growth. The findings show that dynamic leadership was the most important factor in facilitating Farm Producer Companies growth, followed by member hard work and member skill training. The lack of sufficient seed capital for the start-up phase was identified as the most challenging obstacles, followed by a lack of credit from banks and lack of knowledge about intellectual property rights (IPR) issues.

Hennessy et al., (2020) in this paper, researcher studied about challenges in maintaining or increasing the proportion of grazed grass in dairy cow diets. Grass use and quality can be challenging for several reasons, including the cow and sward interaction, and factors influencing dry matter intake. Adapting grazing management strategies can provide opportunities for incorporating grazing and perhaps increase grazing in dairy cow milk production systems. Pasture management tools and techniques offer the opportunity to increase herbage use at grazing. While there are many benefits of grazing including economic, environmental, animal welfare and social, there are also the challenges to maintaining grazed pasture in dairy cow diets. The objective of this paper is to present an overview of the challenges and opportunities for grazing in dairy milk production systems.

Mandi et al., (2022) The paper assesses the impact of membership of dairy cooperative i.e. Jharkhand

State Cooperative Milk Producers' Federation (JMF) on the performance of dairy production systems using propensity score matching techniques. Dairy cooperative members differed significantly from non-members in terms of outcome variables. The mean difference value explained that the socio-economic condition of members was better than non-members. The findings revealed that membership of JMF contributes towards improving yields of dairy animals, net dairy income, and also, to household milk consumption. The non-members reaped better price for the milk in the wet market as compared to the members. Nonetheless, the member-producers recorded higher proportion of milk sale as compared to the non- members which also indicated their intensity of market participation. These results indicate towards the need to improve dairy farmers' linkages through cooperatives or other such institutions for their socio-economic development.

Rath et al., (2022) This study is based on Odisha District, that has a sizable number of dairy producers in its rural and semi-urban areas. In the context of India, the dairy industry plays a crucial role in the growth of the national economy. It supplies people with high-quality milk and dairy products in both urban and rural locations. The sector has been expanding quickly in order to keep up with the nation's rising demand for milk and milk products. The industry reaches customers in urban regions from milk producers in rural areas by executing a number of intermediate operations including collecting, cooling, transportation, pasteurisation, distribution, etc. The dairy industry in India is performing well and exhibiting encouraging trends in terms of milk production, per capita availability of milk, sources of milk production, as well as accessibility of milk. India is experiencing winds of transformation due to better milk availability and a shift to a market economy. The expansion of diary operations in the State has a significant impact on improving the socioeconomic circumstances of rural impoverished people. With the assistance of the Odisha State Co-operative Milk Producers Federation Ltd., the state of Odisha in particular represents the dairy industry's remarkable rise. (OMFED).

Sarkar et al., (2022) conducted research on Milk Producers Organization and Indian Dairy Sector – A Strategic Linkage. This study examines the Milk Producers Organization and its efforts to strengthen capabilities and optimize capacity in Indian dairy sector. India's livestock sector supports the livelihood of around 20.5 million people and the country's milk production is growing at a compound annual growth rate (CAGR) of 4.8%, surpassing the global milk production CAGR of 1.8%. However,

organizations face challenges due to conflicting interests between social interests and business demands. To ensure growth and sustainability, it is important to put in place supportive policies and promote professionalism. In the current globalized business environment, the Milk Producers' Organization has assumed responsibility for competition on domestic and global markets. In order to address emerging international trade practices, further research is needed to develop mechanisms to address sanitary and pytosanitary measures. Exploring a cooperative business model and the use of cow dung and non-productive cattle could contribute to a more cost-effective approach to addressing global milk and dairy price levels.

2.3 Farmers Welfare Programs

Khan N. et al., (2014) in this article, the researcher analyzed the role of dairy cooperatives in the socio-economic development of Moradabad livestock farmers. This study was conducted in Moradabad region. Based on the initial field survey, the villages were selected for detailed investigation. This study shows that about 60% or more of the total milk production is traded through dairy cooperatives in the sampled villages. This regular wage, necessary medical support, and high demand for milk led to the socio-economic development of the people engaged in animal husbandry. Therefore, this study showed the important role of dairy cooperatives in marketing milk and providing the necessary support to farmers leading to socio-economic development.

Sultana, A., (2017) This study looked at the socio-economic characteristics of farmers, the attitude of farmers and finally the problems faced by farmers. To achieve the objective, a systematic method was framed and villages of Mahoba and Taraja taluka were purposively selected to obtain responses from 100 respondents. The data was collected using a structured schedule and for analytical purposes tabular analysis, charts, graphical representations, weighted averages and Henry Garrett's ranking methods were used to obtain the desired results. Findings: Most of the respondents are male and middle-aged farmers with a holding capacity of 4 hectares or more. Most of the respondents had completed secondary education and their farmer income was more than 200,000 yen. Friends & Relatives, Gram Sevak, Progressive Farmers, and Agricultural University scientists found the main source of agricultural information in the study area. In total, 100 percent of farmers have a positive attitude towards farmer production companies.

Lindahla, (2018) a study was done in Assam, Northeast India to make milk safer. They wanted to change the rules and practices to make sure the milk we drink is top-notch. The study talks about a special training program that happened in Guwahati, Assam, India from 2009 to 2013 to make sure our food is safe to eat. The training was designed to be short, simple and tailored, cheap to deliver, easily accessible and accompanied by incentives to change knowledge, attitudes and practices (KAP). In 2014, three results were evaluated: change of KAP; milk production; and prevalence of mastitis. Selected food safety risks were also assessed, although their management was not included in the training. The researcher discovered that farmers who received training were doing better at taking care of their cows. They were making more milk and their cows were getting sick less often. However, the training didn't seem to make a difference in how safe the food was. This study shows that a training intervention can have a medium-term impact, while the issue of food safety is more complex and cannot be assumed to automatically result from successful training.

Chadda et al., (2022) conducted a study on the knowledge and adoption of scientific dairy farming practices among women who use the promotion of Self Help Group institutes. The purpose of this study was to assess the level of knowledge and adoption of Dairy Farming Practices among women availing of Self Help Group Promoting Institutes (SHGPIs) in Ludhiana District, Punjab. SHGPIs included dairy cooperatives, government organizations and non-governmental organizations (NGOs). A total of 120 respondents were randomly selected, with approximately 40 respondents from each SHGPI. Structured interviews were conducted between September 2018 and June 2019. Findings revealed that majority of beneficiaries from dairy cooperative SHGs demonstrated high level of knowledge (45.00%) and acceptance (52.50%) of SLFP. A moderate level of knowledge (62.50%) and acceptance (45.00%) of SLFP was observed among the NGO beneficiaries. The mean difference in knowledge and uptake among beneficiaries of different SHGPIs was found to be statistically significant ($P<0.01$). In case of overall knowledge and acceptance about SLFPs, a significant difference was observed between beneficiaries of dairy cooperatives, government and non-government organizations established SHGs.

2.4 Technology Management

Grasseni et al., (2007) The aim of this researcher is to contribute detailed ethnographic material to broaden the scope of what reproductive technology is by this study. Technology can be defined not only

by a series of laboratory techniques (such as artificial insemination and embryo transfer) that are drafted into the daily management of the animal body, but also by a range of on-farm management strategies and working routines, as well as the cultural dispositions, social networks and tacit knowledge of the actors involved. RT is communicated to lay operators and disseminated amongst semi-professional figures such as breed experts, herd inspectors and technical consultants. The practical contexts in which reproductive knowledge is popularized and applied provide ample scope for local negotiations, resistance and conflict. Professional knowledge about breed-improvement is personalised and appropriated by operators and plays a role in power relations and the exercise of personal charisma as well as being specific to context, in particular the nuances of pre-existing relationships of trust, friendship, kinship or hierarchy. No wonder then that many ambivalences and compromises coexist in the practice of applying 'reproductive knowledge' to breed selection.

Khanal et al., (2010) in this paper, researcher examines adoption rates and adopter characteristics for the following dairy technologies, practices, and systems: holding pen with an udder washer, milking units with automatic take-offs, genetic selection technologies, recombinant bovine somatotropin, membership in the Dairy Herd Improvement Association, computerized feed delivery systems, computerized milking systems, use of a nutritionist to design feed rations, grazing, milking cows 3 times daily, and milking parlors. Four of these were used on a greater percentage of farms in 2005 than in 2000, but increased farm sizes and the interaction of farm size with adoption suggest a greater percentage of milk being produced under each, with the exception of grazing. Except for grazing, technologies were generally complementary.

Okano et al., (2012), In this study, the result of an investigation of the organization of milk producers in the region of Fartura, SP, relations between the various actors in this chain of milk, the benefits obtained from this relationship and classification of these properties in the dairy chain, allowing to measure productivity through the proposed indicators. Research has shown that dairy farmers in the region of Fartura had several benefits to organizing themselves as a Local Productive Arrangement or Social Networks, especially in relation to a better pay the price of a gallon of milk. To achieve these results, farmers had to invest to improve technological standards and production processes and thereby increase milk quality and productivity.

Nipers et al., (2016) in this study researcher observed that the dairy industry was ranked second with 24.1 % in the distribution of agricultural final products in 2014, and more than a third of all commercial agricultural farms were linked to this industry. A combination of the abolishment of the EU milk quota system and the Russian embargo created challenges, which had a significant impact on the agricultural sector. Therefore, it is important to examine various problems related to cow farming and farm technologies, as they are essential for competitive milk production from every cow. It has been found that the key standard solutions, which determine the successful performance of dairy farms, are cow breeds and their potential, conditions and technologies for cow farming, cow diets and cow milking. An examination of 74 dairy farms of various sizes in the entire territory of Latvia revealed that the highest performance results (the highest milk yields per cow) were observed for large farms that kept cows unsanctioned in their cowsheds (the loose-housing system) with no grazing period, and mostly two technologies were used in milking the cows: the herringbone milking system and the carousel milking system. Milking three times a day was practised mostly by farms using the carousel milking system, thus achieving higher milk yields per cow.

Kumar et al., (2021) This study was conducted from January 2020 at the three states i.e. Rajasthan, Uttar Pradesh, and Madhya Pradesh of India to investigate the socio-economic profile, motivational factors, and the reasons behind joining the Farm Producer Companies among farmers. Primary data was collected through a semi-structured interview schedule using a sample of 360 farmers selected from twelve dairy-based Farm Producer Companies of three states. Data were analyzed through frequency, range, and percentage. It was found that most farmers were middle-aged, possess small landholding, educated up to graduate level. The most important reason behind taking the membership of Farm Producer Companies was to enhance the family income through Farm producer companies, better price realization by Farm producer companies, and quick payment settlement. Due to the above reasons, most of the farmers want to join Farm Producer Companies in study areas. The result of the present study helps to enhance the membership of farmer Producer Company through formulating a suitable strategy that should attract the farmer to joining the farmer producer company.

2.5 Institutional Support

Patel A (2016) This article examines the significant growth in India's dairy industry, which aims to

double milk production per animal by 2021-22, with the NDDB estimating 142 million tonnes of milk. This paper proposes a strategic action plan to increase production to 250 million. Ton 2014-15. India, among 194 countries, will take the opportunity to celebrate the 16th World Milk Day on June 1, 2016, highlighting the potential of milk and dairy products to address the country's food security and the livelihood of 70 million farmers. became aware Therefore, more than ever there is a need to double milk production per animal and significantly improve milk quality to meet international standards. The aim of India's animal husbandry is not only to maintain the number one position in milk production in the world, but also to make dairying economically viable and financially viable for small and marginal farmers and agricultural labourers. We have to make it competitive and competitive. Internationalize

Thakur D (2021) analyzed emerging trends in dairy producer organizations in Himachal Pradesh. This study evaluated the performance of dairy producer organizations in the hilly regions of Himachal Pradesh. Three farmer producer organizations that work on community mobilization through self-help groups were selected for the study. Benefits available to members of these organizations range from availability of information, development advice, credit support and veterinary services.

3. **Research Gap:**

Despite the growing emphasis on productivity management programs and practices within milk producer companies, there remains a notable gap in the literature regarding the nuanced assessment of their impact, particularly in diverse operational contexts. While existing studies offer insights into the general efficacy of productivity management initiatives, there is limited exploration into the specific mechanisms through which these programs influence the performance of milk producer companies. Additionally, there is a dearth of research focusing on the comparative analysis of productivity management strategies across different scales of milk production operations, ranging from small-scale local producers to large-scale industrial enterprises. Understanding these variations and their implications for productivity outcomes is crucial for designing tailored interventions that address the unique challenges faced by various types of milk producer companies. Furthermore, there is a lack of longitudinal studies tracking the sustained effects of productivity management programs over time, hindering a comprehensive understanding of their long-term impact on the competitiveness and sustainability of milk producer companies. Closing these gaps in the literature is essential for informing

evidence-based strategies that enhance the efficiency and resilience of milk production systems in diverse socio-economic and environmental contexts.

The research gap raises these research question, which will be answered through this research:

1. What factors influence the adoption and effecting of productivity management practices in dairy farming?
2. How do productivity management practices affect dairy farmer's profitability and sustainability?
3. What strategies do Milk Producer Companies use to manage cost, maximize profit and maintain competitiveness?
4. What criteria should be considered to evaluate the effectiveness of Milk Producer Companies?

4. Need of the study

India produces a lot of milk, but many dairy farms face challenges in managing and caring for cows, affecting productivity. Productivity depends on how well each cow performs. While India is working on supply chain issues, the focus on dairy production and existing farm productivity is crucial. Uttar Pradesh, a big milk-producing state, has many people in dairy farming. Studying milk producer companies there helps understand challenges like lack of knowledge, quality food, and government policies affecting prices. Analysing these companies' business models and strategies can suggest ways to improve efficiency and profits, benefit farmers, and develop the dairy industry. This study contributes to broader research on dairy cooperatives and rural development, showing how these companies empower farmers and support rural livelihoods. Policymakers can use this research to strengthen the dairy sector in Uttar Pradesh and inspire similar efforts in other states facing similar challenges, promoting sustainable development in dairy farming.

5. Research Problem:

Dairy farming plays a significant role in the agricultural economy of Uttar Pradesh, but like any other industry, it faces its own set of challenges. One of the main problems faced by dairy farmers in the state is the lack of proper infrastructure and facilities. Many farmers do not have access to modern equipment and technology, which hinders their productivity and efficiency. Inadequate storage and processing facilities also lead to the wastage of milk, further adding to their financial strain.

Another major issue faced by dairy farmers in Uttar Pradesh is the fluctuating price of milk. The lack of

a stable market and price control mechanism often leaves farmers at the mercy of middlemen and dairy cooperatives. This not only affects their income but also discourages many farmers from expanding their operations or investing in better breeds of cattle. The inability to negotiate fair prices for their produce puts a strain on the financial sustainability of dairy farmers in the state.

Furthermore, other challenges, such as the lack of access to credit and financial resources, as well as the impact of climate change on fodder availability, add to the hardships faced by dairy farmers in Uttar Pradesh. To address these issues, the state government needs to take proactive measures to provide better infrastructure, market support, and financial assistance to dairy farmers. By creating a conducive environment for dairy farming, the state can not only boost its agricultural economy but also improve the livelihoods of thousands of dairy farmers in Uttar Pradesh.

6. Objectives of the study

1.To analyse the present status of productivity management programs and practices of Milk Producer Companies of Uttar Pradesh

Here, we propose to analysis the present status of productivity management programs and practices of Milk Producer Companies of Uttar Pradesh

2. To assess the impact of productivity management programs and practices on Milk Producer Companies growth

Here, we propose to assess the impact of productivity management programs and practices on Milk Producer Companies growth

3. To assess the impact of productivity management programs and practices on dairy farmer's growth

Here, we propose to assess the impact of productivity management programs and practices on dairy farmer's growth

4. To Propose the operational framework and strategies for enhancement in dairy sector

Here, we propose to Propose the operational framework and strategies for enhancement in dairy sector

7. Conceptual framework

The conceptual framework of this proposed study is to develop linkages between milk producers and various management practices that are developed with the support of Milk Producer companies to improve livestock production and the economic life of farmers. Based on the results of targeted research.

Literature review. We propose a conceptual model hypothesis that predicts that the various managerial activities affecting the operations of dairy enterprises and the socio-economic life of farmers are interconnected. Productivity management, together with other management activities such as technology management, institutional support for farmers' welfare programs and marketing management, act as a precedent for changing the efficiency of dairy enterprises and its consequences are social and economic.

In India, productivity management plays an important role in the dairy farming. Farmers face many problems, including low yields, high rates of livestock disease, and lack of knowledge on how to manage livestock. However, the major focus of dairy enterprises is to improve the milk yield of farm animals with veterinary facilities and to supply quality feed for farm animals. Milk producer companies also provide livestock training facilities to farmers. Small and marginal enterprises face major institutional challenges related to funding and credit facilities from the Treasury. While these problems are increased due to a lack of knowledge among livestock farmers, milk companies provide funding for animal development training programs aimed at promoting livestock business activities. Milk companies provide government programs directly to farmers such as.

- **Productivity Management:** Productivity management in the dairy sector involves optimizing resources to maximize output while minimizing costs and inefficiencies. This includes efficient herd management practices, such as proper breeding, nutrition, and health protocols to ensure high milk yields. Implementing modern technologies like data analytics, IoT devices, and automated milking systems can streamline operations and enhance productivity. Regular monitoring of key performance indicators, such as milk production per cow and feed conversion rates, helps identify areas for improvement. Additionally, training and development programs for dairy farm staff contribute to a skilled workforce capable of driving productivity gains in the sector.
- **Technology Management:** Technology management in the dairy sector involves strategic adoption of innovations like automated milking systems and sensors for quality control. It optimizes supply chains with inventory management and traceability technologies, ensuring product safety. Data analytics tools are utilized to enhance productivity and sustainability, while processing innovation focuses on efficiency and product quality. Overall, it's about leveraging technology to streamline

operations, improve efficiency, and meet consumer demands in a competitive market.

- **Institutional Support:** This includes providing access to veterinary services, technical expertise, and training programs to enhance farming practices. Financial assistance in the form of loans or subsidies may be offered to invest in infrastructure and equipment. These companies also facilitate market linkages, ensuring farmers have a reliable outlet for their milk production. Additionally, they may offer insurance schemes to protect farmers against risks such as animal diseases or market fluctuations. Overall, this support helps dairy farmers improve productivity, profitability, and resilience in their operations.

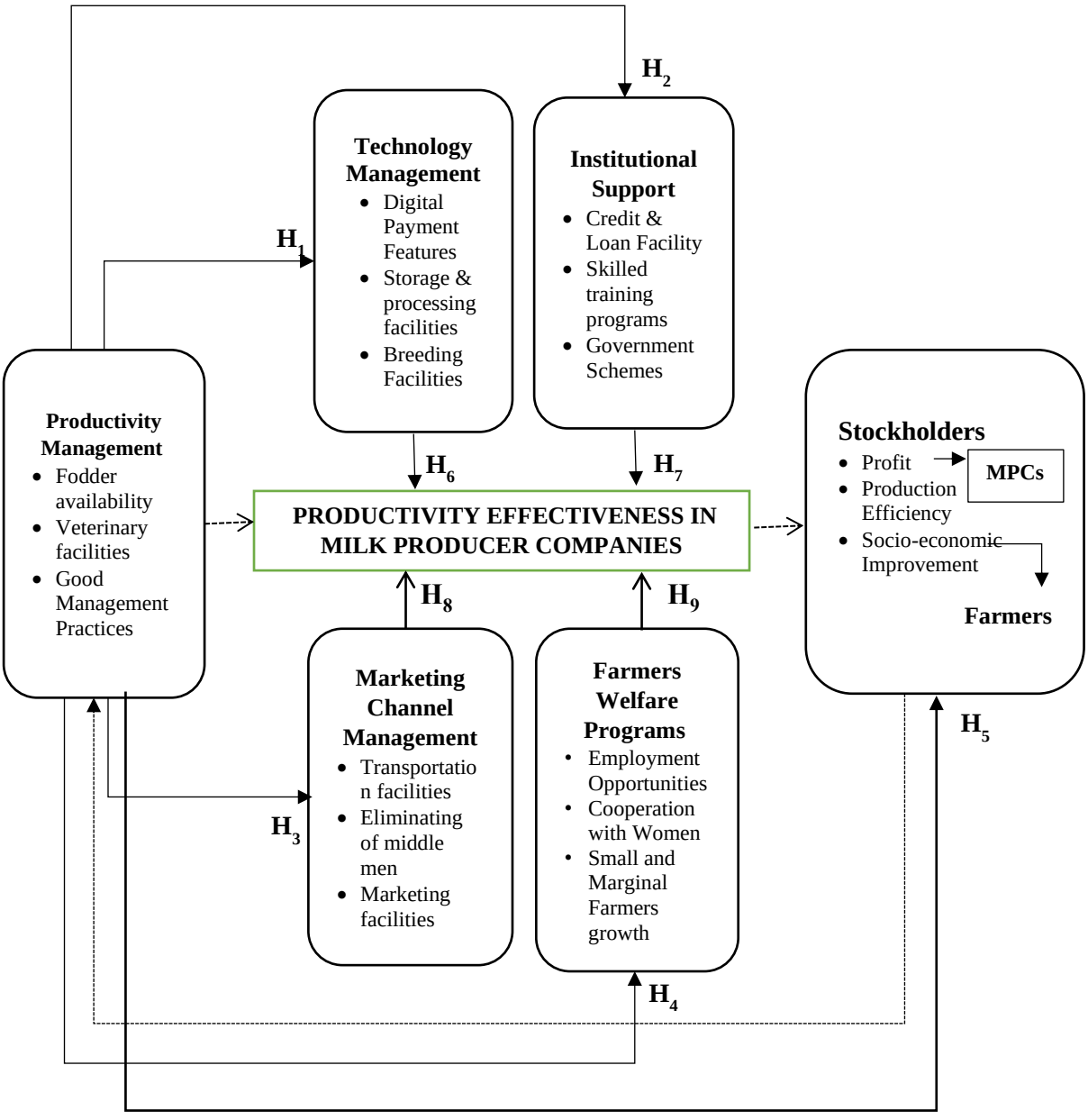

Figure 4: Conceptual Framework
(Source: Research's Conceptualisation)

- **Marketing Channel Management:** It involves a coordinated flow of milk from farms to processing facilities. Milk collection centres act as intermediaries, aggregating milk from multiple farmers for transportation to processing plants. Milk producer companies provide logistical support, including transportation and storage facilities, to ensure timely collection and delivery of milk. Quality control measures are implemented throughout the supply chain to maintain product integrity. Transparent communication and collaboration between farmers and producer companies are essential for optimizing efficiency and meeting market demands.
- **Farmers' Welfare Programs:** Farmers' welfare programs in the dairy sector provide support to farmers through training, access to resources, financial aid, and market assistance. These initiatives aim to enhance farmers' productivity, income, and quality of life while ensuring sustainable dairy farming practices. They include training in best practices, access to veterinary services and inputs, financial assistance for infrastructure, and market linkages for fair pricing. Overall, these programs contribute to the well-being and prosperity of dairy farmers and their communities.

7.1 Research hypothesis

The study will be carried out to test the following hypotheses. The hypotheses for the study are formulated on the basis of previous studies and relevant literature as well as research questions.

H_{01}: There is no relation between Productivity Management and technology management.

Ha_1: There is relation between Productivity Management and technology management.

H_{02}: There is no relation between Productivity Management and Institutional Support.

H_{a2}: There is relation between Productivity Management and Institutional Support.

H_{03}: There is no relation between Productivity Management and Marketing Channel Management.

H_{a3}: There is relation between Productivity Management and Marketing Channel Management.

H_{04}: There is no relation between Productivity Management and Farmers Welfare Programs.

H_{a4}: There is relation between Productivity Management and Farmers Welfare Programs.

H_{05}: There is no relation between Productivity Management and Farmers Wellbeing

H_{a5}: There is relation between Productivity Management and Farmers Wellbeing

H_{06}: There is no impact of technology management on productivity effectiveness of Milk Producer Companies.

H_{a6}: There is impact of technology management on productivity effectiveness of Milk Producer Companies.

H_{07}: There is no impact of institutional support on productivity effectiveness of Milk Producer Companies.

H_{a7}: There is impact of institutional support on productivity effectiveness of Milk Producer Companies.

H_{08}: There is no impact of Marketing Channel Management productivity effectiveness of Milk Producer Companies.

H_{a8}: There is impact of Marketing Channel Management productivity effectiveness of Milk Producer Companies.

H_{09}: There is no impact of Farmers Welfare Programme on productivity effectiveness of Milk Producer Companies.

H_{a9}: There is impact of Farmers Welfare Programme on productivity effectiveness of Milk Producer Companies.

H_{010}: There is no significant impact of Productivity Management Practices on Milk Producer Companies.

H_{a10}: There is significant impact of Productivity Management Practices on Milk Producer Companies.

8. Research Methodology

8.1 Research Design

The research work shall be a descriptive and selective based on a survey technique.

8.2 Scope of the study

The scope of the study will be confined to selected milk producer companies in Uttar Pradesh. Uttar Pradesh is the largest milk producing state in India with the highest milk production in the whole of India, producing 18% milk compared to other Indian states such as Rajasthan 11%, Andhra Pradesh 10%, Gujarat 8% and Punjab**.** Research will help to identify an opportunity to know the level of knowledge of animal health, sanitary milking, nutrition, animal breeding, animal welfare, environment and socio-economic management in good animal husbandry practices. It will also helpful for policy makers, planners, managers, veterinary departments, and field veterinarians to identify technology gaps

in best dairy farming practices and prepare the most effective dairy farming practices. It will actually be useful because you can be able to do it. To make ranching a money-making business, you need a training program based on it.

8.3 Sampling Design

Multistage Sampling and snowball Sampling will be used to draw representative samples from the population for the study

8.4 Sample Frame

Table 1: Summary of selected Milk Producer Companies

Sr. No.	Company Name *	No. of Members	Location	Web link
1.	Saahaj Milk Producer Company Ltd	109,923	Agra	https://saahajmilk.com/
2.	Balinee Milk Producer Company Ltd	63000	Jhansi	https://www.balineemilk.com/
3.	Kashee Milk Producer Company Ltd	35000	Banaras	https://www.kasheemilk.com/
4.	Harit Pradesh Milk Producer Compnay	30000	Meerut	https://www.haritpmilk.com/
5.	Shwetdhara Milk Producer Company Limited	5153	Ayodhya	https://www.shwetdharamilk.com/
	Total Member	243076		

(Source: Homepage of Websites)

Milk Producer Companies are selected from (Agra, Ayodhya, Jhansi, Meerut, Varanasi) Uttar Pradesh. The selection of companies is that these are five major Milk Producer Companies in Uttar Pradesh, which have more than 1 lakh litre milk production per day and have more than 5000 members of company. Data will be collect from farmers, employees and managers of these companies.

7.5 Sample Size

The population from which the sample needs to be drawn is infinite. If a population is higher than 50,000, it is said to be infinite. Therefore, the sample size has been calculated using the sample size formula for the infinite population through a precision rate and confidence level approach to arrive at a representative number of respondents (Godden, 2004).

$$SS = Z^2 \times (p) \times (1-p) / C^2$$

Where, SS= Sample size for the infinite population (Godden, 2004)

Z= Z value

p= Population proportion

C = Margin of Error at 5% (0.05) **(**Equation 1**)**

To minimize the bias and obtain a realistic sample size, three scenarios are evaluated-

Scenario I Estimating 10% of the population with a 6% Margin of Error

Scenario II Estimating 30% of the population with a 5% Margin of Error

Scenario III Estimating 50% of the population with a 4% Margin of Error

Table 2: Calculation of Sample Size

Scenario	Population Proportion	Value of Z (95% Confidence Level)	Error of Margin	Sample Size Calculation	Sample Size
I	10%	1.96	0.06	$=\frac{1.96^2\ 0.1(1-0.1)}{0.06^2}$	96
II	30%	1.96	0.05	$=\frac{1.96^2\ 0.3(1-0.3)}{0.05^2}$	323
III	50%	1.96	0.04	$=\frac{1.96^2\ 0.05(1-0.5)}{0.\ 04^2}$	600
Total					**1019**
Average					**340**

Therefore, the sample size for the study will be 340.Since we are using snowball sampling, we are flexible for large response as well.

8.6 Sample Composition

In order to collect the data, sample shall be drawn from the selected Milk Producer Companies from Uttar Pradesh. The Collection of sample divided between selected company's farmers, employees and managers of these companies.

Table 3: Sample respondents

Sample Population	Sample Size
Farmers	300
Employees and Managers in (MPCs)	40
Total	340

8.6 Sources of data collection

8.6.1 Primary Data

The tools which shall be used for primary data collection will be Questionnaires. The Structured Questionnaire will be administered to collect data from the respondents. The Questionnaire will be distributed offline to the farmers, who are involved in milk production.

8.6.2 Secondary Data

The pertinent secondary data related to the proposed research problem of the study will be collected through various magazines, newspapers, internet and libraries, Websites, Books, Journals, and Other published and unpublished sources for collection of secondary data.

8.7 Statistical Tools

To test the proposed relationships, data will be analysed using statistical tools like Descriptive Analysis, Correlation Analysis, System Dynamic Approach, ANOVA (Analysis of Variance), Multivariate ANOVA (MANOVA), Regression Analysis, Reliability and Validity etc.

Table 4: Summary of proposed analysis tools

Type of Method	Questionnaire, Survey
Type of Study	Descriptive and selective based on a survey technique
Population	243076
Type of Population	Infinite
Sampling Frame	Selected farmers and employees of the milk producer companies
Sampling Method	Snowball sampling
Statistical Tools & Techniques	ANOVA, Correlation analysis, Regression analysis, Smart-PLS, and Structural Equation Modelling (SEM)
Sample Size	**$SS = Z^2 \times (p) \times (1-p) / C^2$** Where, SS= Sample size for the infinite population (Godden, 2004) Z= Z value p= Population proportion C = Margin of Error at 5% (0.05) Therefore, the sample size for the study will be 340.

9. Implications of the Study

Exploring the growth of dairy farmers within milk producer companies provides insights into the economic, market, technological, sustainability, and social dynamics of the dairy industry. These findings can inform policymakers, industry stakeholders, and government about the opportunities and challenges faced by dairy farmers, guiding the formulation of targeted policies and interventions to support their growth and enhance the competitiveness and sustainability of the dairy sector.

10. PROPOSED CHAPTERIZATION

The structure of proposed research will be as follows:

Chapter 1: Introduction

Chapter 2: Review of Literature

Chapter 3: Research Methodology

Chapter 4: Analysis and Results

Chapter 5: Conclusion and Directions for Future Research

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collective action?. *Environment and Planning A*, *44*(2), 411-427.

APPENDEX

SYNTHESIZED MATRIX OF REVIEW OF LITERATURE

S. No.	Author	Productivity Management Programs	Technology Management	Marketing Channel Management	Institutional Support	Farmers Welfare program
1.	C. Grasseni (2007)		✓			
2.	A. R. Khanal (2010)	✓	✓			
3.	Trebbin, Hassler (2012)		✓	✓		
4.	T. Okano (2012)	✓	✓		✓	
5.	Jeffrey Gillespie(2014)	✓	✓			
6.	Nizamuddin Khan(2014)	✓		✓		✓
7.	G Nagrale (2015)	✓	✓	✓		
8.	Patel A (2016)	✓	✓	✓	✓	
9.	Nipers,A (2016)		✓			
10.	P. J. Sankar (2016)			✓		
11.	Sultana (2017)	✓	✓		✓	
12.	Lindahl (2018)	✓	✓			✓
13.	H. Lemma D (2018)	✓				
14.	Nikam (2019)			✓		✓
15.	A. Mukherjee (2019)		✓		✓	
16.	Sivaraman,I(2019)	✓	✓			
17.	Jose,Meena (2019)		✓	✓	✓	✓
18.	Sigfredo Fuentes(2020)	✓				
19.	D Hennessy (2020)	✓				
20.	Mukherjee A,(2020)		✓	✓	✓	
21.	VV Gamit,(2020)	✓	✓			

22.	Sarkar, Dutta(2020)	✓	✓	✓	✓	
23.	Thakur D (2021)	✓	✓	✓		✓
24.	S. Kumar (2021)		✓			
25.	Rath, P K (2022)			✓		
26.	Mandi K (2022)			✓		
27.	G. Sheikh (2022)	✓				
28.	Monica K(2022)	✓				
29.	Chadda, (2022)	✓	✓			✓
30.	Singh, D (2023)	✓	✓	✓		